

3. (Amended) A process as claimed in claim 1, wherein the electronic signal is obtained by exposing the mixture or a portion thereof to a magnetic field and simultaneously applying an alternating electromagnetic field, the resonance caused by the N-oxyl radicals being detected.

4. (Amended) A process as claimed in claim 2, in which the distillation is carried out in a cascade of a plurality of distillation columns, wherein a high boiler fraction containing the stabilizer system accumulates in the bottom of at least one distillation column and a part-stream of the high boiler fraction is removed and is mixed with the feed of an upstream column.

5. (Amended) A process as claimed in claim 1, wherein the concentration of the N-oxyl radicals in the mixture is from 5 to 150 ppm, based on ethylenically unsaturated compounds.

6. (Amended) A process as claimed in claim 1, wherein the stabilizer system furthermore contains a polymerization retardant.

8. (Amended) A process as claimed in claim 1, wherein the ethylenically unsaturated compound is a vinylaromatic compound.

9. (Amended) A process as claimed in claim 1, wherein the reference value is dependent on at least one further measured variable which is selected from a temperature, a redox potential, an NIR transmission or absorption, the turbidity, viscosity, density or a refractive index.